Florence Copper: Mechanical Integrity Testing Procedure

A. Install packer equipment within the 5- or 8-inch nominal diameter casing on tubing to the top of the PVC screen, generally between 450 and 490 feet. The perforated tubing joint will be connected just above the lower packer. If required, install the upper packer on the tubing in the casing within approximately 5 feet of land surface.

B. Inflate the lower packer with compressed gas to a pressure recommended by the manufacturer based on the differential pressures and the weight of the packer equipment and tubing.

- The differential pressure will be the difference between the test pressure (approximately 110 percent the permitted maximum wellhead injection pressure indicated for each well) and the formation pressure (based on feet of formation water above lower packer).
- The maximum wellhead injection pressure is based on a fracture gradient of 0.65 psi/foot of depth measured from land surface to the top of the injection interval, which is represented by the bottom of the casing.

C. Fill the casing with water by pumping test water into the tubing.

D. Connect pressure monitoring equipment and bean pump to tubing.

E. Purge air from the system including the tubing, pressure monitoring equipment, and bean pump.

F. Inflate the upper packer or connect wellhead assembly to provide a seal between the tubing and the top of casing as per manufacturer recommendation.

G. Compensation for the installation of the equipment and filling the test interval with water shall be based on the itemized cost for setup at each well.

H. Compensation for testing shall be at an hourly rate which extends from the time the upper packer is inflated or wellhead assembly is connected until the time the upper packer is deflated or the wellhead assembly is disconnected.

I. If the temperature of the test water varies significantly from the formation water, pressure fluctuations may occur due to the contraction or expansion of the water column as the temperature of the formation and test water equilibrates in the casing.

J. The HYDROGEOLOGIST may measure the temperature of the water in the casing with a temperature probe on a cable which will run in the tubing. Compensation for standby time, as

directed by the HYDROGEOLOGIST, during test water temperature equilibration shall be at an hourly testing rate if conducted during a typical work day period.

K. With the bean pump, pressurize the water within the casing to approximately 110 percent the permitted maximum wellhead injection pressure indicated for each well:

- Isolate the pressure in the casing from the bean pump with a valve;
- Monitor and log the casing pressure over a period of at least 30 minutes;
- The well passes the mechanical integrity test if there is less than a 5 percent change in pressure during the test period; and
- Testing will be conducted as directed by the HYDROGEOLOGIST.

L. Once testing is complete as directed by the HYDROGEOLOGIST, pressure from the casing will be released and the water return from will be collected in sealpot assembly. The HYDROGEOLOGIST will measure the volume of the return from the sealpot assembly as an indication of the length of the tested interval. The volume in gallons returned water can be calculated based on the test pressure (psi) times the annular volume of the casing (gallons per foot) times the length of the test interval (feet) times 0.0000032 which is the compressibility of water (gallon per gallon per psi).

M. Deflate upper packer or remove wellhead assembly, hourly compensation for testing ceases once upper packer is deflated or wellhead assembly is removed.

N. Deflate lower packer.

O. Remove packer testing equipment. Compensation to remove packer testing equipment will be included with the packer setup charge for each well.

P. Proceed to test the next well as directed by the HYDROGEOLOGIST or demobilize if testing is complete.